Introduction – What is Economic Development?

Economic Development, the process of creating wealth through the generation of marketable goods and services, falls to the leaders of communities—most often local governments. As chief economic developers, these local governments are charged with increasing the economic vitality of their communities by expanding job opportunities as well as the tax base.

In order to achieve this task, a combination of tactics must be employed, all geared toward making the community attractive and desirable for location to potential clients; in other words, the entire Economic Development process should be considered a specialized form of marketing.

Using a Geographic Information System to locate and display potential development sites can help attract new industry, stimulating economic growth. Population demographics, infrastructure, marketing studies – all of these can be integrated into a GIS providing a wealth of information to planners and potential developers.

The following section is intended to provide an outline of what data needs to be assembled to create a functional Economic Development GIS, as well as guidelines for data acquisition.

A) Site Location and Evaluation

If a prospective industry is not interested in any existing buildings or sites in the inventory (discussed in the Building Inventory section) they may wish to develop their own site. The challenge now becomes allowing the client to evaluate all existing properties based on characteristics more related to site design and construction.

A proposed site development relies more heavily on the topology of a given area. Information about terrain, drainage features, existing utilities, etc become more of an issue and needs to be addressed by the GIS. Many of the features that would attract a client to an existing site also apply to potential development sites. Any features affecting construction should be included in the GIS as well as any features contributing to the local quality of life.

1) Spatial Data

a) Minimum Requirements

- Existing building footprints
- Site contours
- Infrastructure nearby (roads, rails)
- Parcel boundaries/easements
- Utility Mapping

b) Optional Requirements

- Digital orthophotography
- Hydrology

2) Attribute Data

a) Minimum Requirements

- Existing building footprints
  - ⇒ Unique identifier for each building
  - ⇒ Availability
  - ⇒ Assessed building value
  - ⇒ Owner's name
  - ⇒ Owner's contact information
  - ⇒ Square footage of building
- Site contours
  - ⇒ Elevation
- Infrastructure nearby

⇒ Road number/name
⇒ Road surface type
⇒ Road edge of pavement
⇒ Road right-of-way width
⇒ Road age
⇒ Road capacity
⇒ Rail type (gauge)
⇒ Rail owner
⇒ Rail age
⇒ Rail capacity

- Parcel boundaries/easements
  - ⇒ Unique identifier for each parcel
  - ⇒ Availability
  - ⇒ Assessed parcel value
  - ⇒ Owner's name
  - ⇒ Owner's contact information
  - ⇒ Available utilities
  - ⇒ Parcel acreage
  - ⇒ Parcel zoning
  - ⇒ Distance to nearest road
  - ⇒ Distance to nearest rail
  - ⇒ Distance to nearest river
  - ⇒ Distance to nearest local airport
  - ⇒ Distance to nearest commercial airport
- Utility mapping
  - ⇒ Water line diameter
  - ⇒ Water line material
  - ⇒ Water line age
  - ⇒ Water line source (river, WTP)
  - ⇒ Sewer line diameter
  - ⇒ Sewer line material
  - ⇒ Sewer line type (forced, gravity)
  - ⇒ Sewer line age
  - ⇒ Sewer line destination (STP)

b) Optional Requirements

- Hydrology
  - ⇒ Name
  - ⇒ Width
  - ⇒ Depth
  - ⇒ Flow direction

3) Data Acquisition Options

a) Planimetric Mapping

- On-screen (heads-up) digitization of map features from orthophotography
  - ⇒ Quick and inexpensive, but less accurate than using stereo plotters
- In-house Survey – GPS or traditional methods
  - ⇒ Accuracy and cost vary depending on equipment and personnel
- Contract with third party vendor for digitization work
  - ⇒ High degree of accuracy, increase in cost

b) Orthophotography sources

- VGIN's VBMP imagery
- USGS orthophotography (DOQs)
- Aerial photography from a third party vendor

c) Parcel boundaries/easements

- If not available digitally, on-screen (heads-up) digitization of map features from hard-copy tax maps.
- May be available in digital form from assessor's office or commissioner of revenue.

d) Inventory database

- Manually verify and enter attributes for each building and/or site.
- Currently available industrial structures/sites are available from the Virginia Economic Development Partnership, VEDP, (at http://gis.vedp.org).

e) Utility mapping

- Water line and sewer line mapping is available from VEDP.

4) Data Conflation Options

a) Verify parcel boundary locations against the digital orthophotography.

b) If inaccuracies exist, they can be manually rubbersheeted to the photography through a process of heads-up digitization.

- Rubbersheet the tax parcel boundary data to the orthophotography, using the imagery as a reference rather than as a determiner of absolute property location. A real estate database can be used to check property addresses against existing E-911 street address mapping.

c) Maintain relative parcel size, geometry, and orientation within a section map.

5) GUI/Programming Options

a) Once the data is complete, and a system is fully functional, custom queries and searches may be implemented to retrieve commercial buildings or sites according to the attribute information discussed in Sub Application 2 – Attribute Data. Searches and queries by multiple attributes will be most useful to prospective developers – for example, search by square footage, assessed value and availability.

6) Internet Functionality and Options

a) Data can be used for an online GIS application after the mapping has been linked to the inventory database.

b) GIS used by developers, business owners, planners, and commercial real estate agents.

7) Technical Requirements

a) Minimum Requirements

- 400-MHz
- 2-GB hard drive
- 256-MB RAM
- 15” monitor
- CAD/GIS software
- Internet connection (for downloading data, if applicable)

b) Optional Requirements

- A faster machine will make work quicker; listed above is absolute minimum
- 850-MHz or above recommended
- 20-GB hard drive for increased storage space
- 512-MB RAM for faster regeneration and manipulation of data
- 17” or 19” monitor for increased screen resolution (and larger viewing area)

8) Administrative/Management Requirements

a) During development

- Complete commercial building inventory
- Field verification of building addresses (if necessary)
- Acquiring real estate database
- Advertising the GIS to real estate agents and chambers of commerce

b) After deployment

- Scheduled reviews/revisions/updates

9) Cost – Cost/Benefit

a) In-house

- GIS technician - $8-$14 per hour
- Project manager - $16-$20 per hour
- Note: in-house costs do not include benefits and overhead

b) Contracted

- GIS technician - $30-$50 per hour
- Project manager - $55-$70 per hour

c) Schedule:

- Using the following items from the Schedule section, we can estimate a cost per map sheet for digital work.
  - ⇒ Scanning (10 minutes per sheet)
  - ⇒ Digitization (3 hours per sheet)
  - ⇒ Annotation (1 hours per sheet)
  - ⇒ Conflation (8 hours per sheet)
  - ⇒ Total time per sheet is *about* 13-14 hours.
- A typical Virginia county is comprised of about 100 tax map sheets. Larger counties will include more; small counties will include fewer.
- Therefore, an average county will require about 1300-1400 hours to complete the digital parcel mapping tasks listed above, or about $10,000 to $20,000 if done in-house.
- These are average estimates; time for any given tax map (or even an entire jurisdiction) will vary greatly. Use the scale bar on each of your tax maps to determine how many encompass the area you desire.

d) Benefits of a GIS

- A GIS provides a powerful, logical, and intuitive means to store, manipulate, and retrieve data.
- It can maintain, analyze, and report on geographic data such as points and symbols, lines and curves or polygons, and attribute data such as characters, numbers, and dates.
- A GIS provides the ability to see on screen or in map form, only those features or objects that meet specific selection criteria.
- In an instant, you can visually identify features in a geographic representation that would take much longer to find in a printed report.
- GIS is an effective tool for building and site inventory because it can store, and query, spatial and attribute information about any particular feature.

10) Standards/Guidelines Summary

a) Must have a standard layer convention used throughout all digitized tax maps for accuracy and organization of data; for example:

- "*Building Footprints*" Layer
  - ⇒ Color: brown
  - ⇒ Weight: .05mm
- "*Site Limits*" Layer
  - ⇒ Color: green
  - ⇒ Weight: .05mm
- "*Dimensions*" Layer
  - ⇒ Color: blue
  - ⇒ Text height: 30'

11) Startup Procedures/Steps

a) Digitization

- On-screen (heads-up) digitization
  - ⇒ Digitize, or acquire digitally, all commercial building footprints and site boundaries.
  - ⇒ Digitize, or acquire digitally, all parcel lines and easements relating to property.
  - ⇒ Digitize, or acquire digitally, all transportation features (roads, railroads, etc.).
  - ⇒ Digitize, or acquire digitally, all natural features (streams, ponds, etc.).
  - ⇒ Digitize, or acquire digitally, contours in future development areas.

b) Annotation

- Label footprints and sites using a unique identifying number. This will be used to link the mapping to the inventory database.
- Keep text insertion points inside of the referenced features, for ease in reading, database creation and linking after the data is ready.
- Minimum annotation needed:
  - ⇒ Unique building/site identification numbers.
- Optional:
  - ⇒ Dimensions
  - ⇒ Acreage
  - ⇒ Ownership information
  - ⇒ Land value
  - ⇒ Structure value
  - ⇒ Total value
  - ⇒ Zone type
  - ⇒ Assessment date

c) Conflation

- Verify that all digital orthophotography image tiles to cover the county or interest area are accessible.
- Use CAD/GIS software to mosaic all image tiles into one complete image, for ease of use.
- Conflate digital mapping as necessary to match orthophotography.

12) Estimated Time Line and/or Implementation Schedule

a) Basic tasks and estimated time, per tax map sheet, per task.

- Scanning (10 minutes) per sheet
- Digitization (3 hours) per sheet
- Annotation (1 hours) per sheet
- Conflation (4 hours) per sheet
- Edge-matching (30 minutes) per sheet

b) Approximately 8 to 10 man-hours are needed to accomplish the above tasks for each tax map. This is based on a moderately populated area. Variations in population density can shorten or lengthen the time needed to complete all data for a single tax map.

13) Best Practice Examples in Virginia

a) The Virginia Economic Development Partnership provides a number of valuable development tools as well as a wealth of available GIS data - http://www.yesvirginia.org/ and http://gis.vedp.org/.